

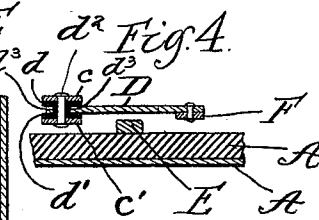
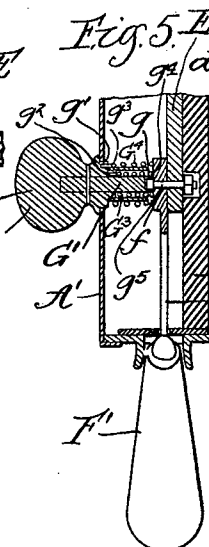
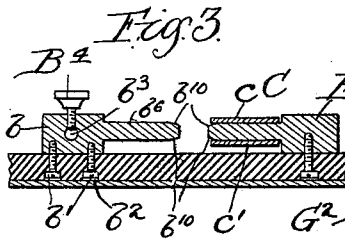
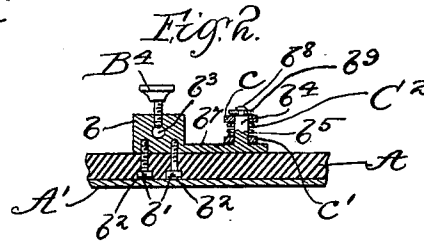
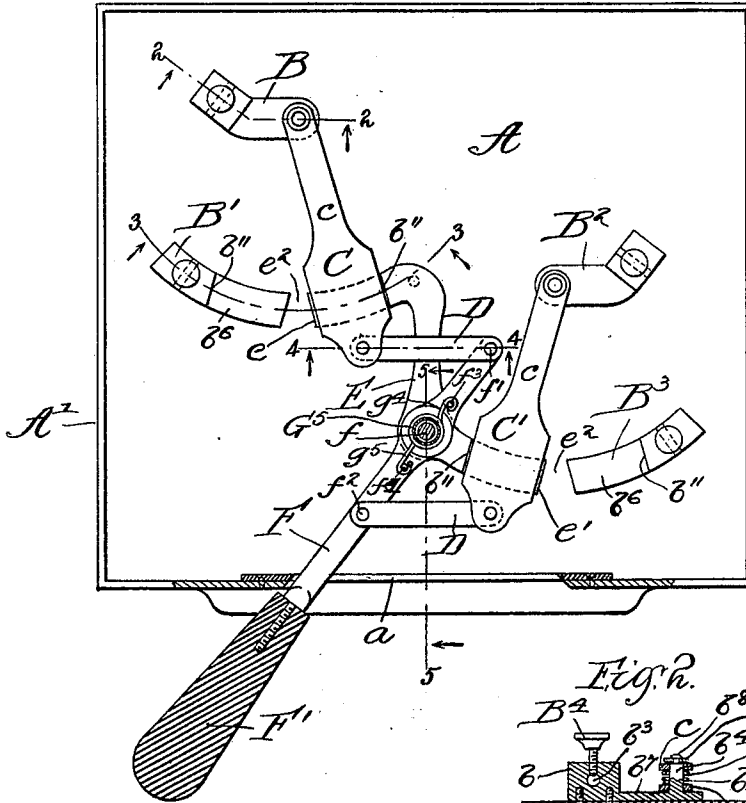
(No Model.)

E. H. WRIGHT.
ELECTRIC SWITCH.

No. 582,840.

Patented May 18, 1897.

Fig. 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 582,840, dated May 18, 1897.

Application filed March 13, 1896. Serial No. 583,030. (No model.)

To all whom it may concern:

Be it known that I, ELMER H. WRIGHT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Switches; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in electric switches, and relates more particularly to an improved blade-switch especially designed for use in arc-lighting, but obviously capable of use in other connections. Electric switches of this character as heretofore commonly constructed have been defective in various respects. Among the defects commonly found in such switches may be mentioned the following: Owing to the heating due to the resistance of the current in passing through the switch and to the fact that the resistance is increased both by an increase of current and by the heating of the metal composing the switch many of the switches now in use which have a carrying capacity theoretically amply sufficient to carry any ordinary current are found in use to be insufficient and to burn out apparently without cause. This is due, at least in a measure, to the fact that the contact members or blades of switches as now commonly constructed do not remain perfectly in contact under the heating and expansive action incident to a powerful current, thus creating an increased resistance at the point of imperfect contact and reducing the normal current-carrying capacity of the switch until the switch suddenly burns out. Another disadvantage is that in the construction now commonly employed any slight permanent warping of the members, due to heating, renders the switch defective in its operation or throws the members out of register with each other, so that they do not readily go into contact, especially when manipulated by unskilled operators, and in such event a partial closure only of the switch will result in a burning out of the latter in a very few seconds when used to carry the high voltage now commonly employed in arc-lighting.

It is the object of the present invention,

therefore, to provide a simple, practical, and improved construction in which the carrying capacity of the switch is not only ample, but in which the contacts are so constructed as to retain perfect contact with each other under any abnormal current, in which the movable members are accurately and positively guided from one fixed member to the other, and in which the current is fully closed through the fixed members to which the movable members are being shifted before the contact is broken with the fixed member with which the movable member has previously been in contact.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the same will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a top plan view of a switch embodying my invention, the covering cap or casing of the switchboard being removed in order to expose the mechanism of the switch proper and parts of the switch-lever being shown in horizontal section to more clearly disclose the construction of the same. Fig. 2 is a transverse vertical sectional view taken on line 2 2 of Fig. 1. Figs. 3, 4, and 5 are similar views taken on lines 3 3, 4 4, and 5 5, respectively, of said Fig. 1.

Referring to the drawings, A designates as a whole a switchboard of any suitable insulating material, herein shown as of rectangular form and as provided with a cover or casing A', adapted to inclose and protect the switch mechanism.

Referring more particularly to the switch mechanism, B B' and B² B³, respectively, designate two pairs of fixed contact-points mounted upon the switchboard A at opposite sides thereof, forming the terminals of line-circuits. With each of the terminals B and B² is pivotally connected a movable member C C', respectively, adapted to be oscillated into contact with the other fixed terminal of the pair, so as to close the circuit from one to the other.

The several fixed terminals B B' B² B³ and the movable members C C' are of novel construction and are as follows: Each of the members B B' B² B³ consists of a base portion

b, suitably secured to the switchboard *A*, conveniently by means of screws *b' b'*, inserted from the under side of the switchboard upwardly through the latter and into the said base portion *b*, the heads of the screws being countersunk below the surface of the board, so as to provide insulating-spaces *b²* between the said screws and the outer metallic casing *A'* of the switchboard, as indicated clearly in Figs. 2 and 3.

b³ designate transversely-extending apertures or sockets extending horizontally through the body portions of the terminals for the reception of the ends of the line-wire, said sockets being intersected by the usual binding-screws *B⁴ B⁴*, threaded into suitable sockets formed to extend vertically into the upper sides of said terminals.

The terminals *B B²*, with which the movable members *C C'* are pivotally connected, are each provided with a laterally-extended part *b⁷*, which is arranged to rest directly in contact with the upper surface of the switchboard and is provided at its outer end with a vertical stud *b⁴*, forming the pivot upon which the movable member is mounted, so as to oscillate in a horizontal plane.

The movable members *C C'* each consists of two horizontally-arranged plates *c c'*, arranged one above the other, parallel with each other, but held at a distance apart by means of suitable spacing devices. The pivotal ends of the parts *c c'* are held at a suitable distance apart by means of a spacing device *b⁵*, mounted upon the pivot-stud *b⁴* between said plates, such spacing device consisting, preferably and as herein shown, of an expansive coiled spring *C²*. The upper member *c* of each pair will be held upon its pivot-stud *b⁴* by means of a suitable retaining-screw *b⁸* and washer *b⁹*, or by other suitable means, while the lower member *c'* rests directly upon the part *b⁷*. The opposite or oscillatory ends of each pair of blades *c c'* are held apart by means of a link *D* and insulating plates or washers *d d'*, interposed between said members above and below the link, as indicated clearly in Fig. 4, each of the links being connected with its respective member *C* or *C'* by means of a rivet *d²*, inserted vertically through said parts. The rivets *d²* are also insulated from the link by means of suitable insulating-sleeves *d³ d³*, as shown.

Each of the terminals *B' B³* is also provided with a lateral horizontally-arranged extension *b⁶*, forming a blade upon which the two-part movable member is adapted to fit, said blades *b⁶* being each preferably curved in an arc concentric with the pivot of the movable member and being arranged to stand in the same plane with the space between the upper and lower parts of the movable member. The thickness of the blades *b⁶* is slightly greater than the distance between the parts *c c'* of the members adapted to fit thereon, and they are made of gradually-increasing thickness from their free ends inwardly, so as to insure

a tight or wedging fit and perfect contact between said parts, and in order to facilitate the entrance of the blade between said parts it is chamfered or beveled at its end slightly, as shown at *b¹⁰ b¹⁰*.

E designates a contact-block having somewhat the shape of an *S*, suitably secured rigidly upon the base *A* between the opposite pairs of terminals thereon and provided at each end with a contact-blade *ee'*, respectively, similar to the blades *b⁶*. Said blades *e* and *e'* are arranged in circumferential alinement with the adjacent blades of the terminals *B' B³*, respectively, and are separated from the latter by spaces *e² e²* less than the width of the movable members, so that in being shifted from one blade to the other the movable member will close the circuit, through the blade to which it is being shifted, before it breaks contact with the blade which it is leaving. This construction is a feature of importance, inasmuch as it not only prevents sparking, which is very destructive to the blades, but it also obviates the objectionable flickering of the lights incident to interrupting and closing the circuit.

In order to actuate the movable members *C* and *C'* simultaneously, I provide a switch-lever *F*, which is pivotally mounted upon the base *A* at a point between its ends, desirably and as herein shown, upon a pivot *f*, which is arranged to extend vertically through the part *E*, near the middle thereof. At points *f' f²*, equidistant from the pivotal axis of said switch-lever, the ends of the links *D D* are pivotally connected therewith, so that when the lever is oscillated in one direction or the other both switch members will be simultaneously carried into or out of contact with the blades *ee'* of the part *E*. Suitable shoulders *b¹¹* on the several blades serve to limit the extent of movement of the switch members. The switch-lever *F* is arranged to project outwardly through a suitable opening *a* in one side of the casing *A'* and is provided exteriorly to the box with a suitable handle *F'*, whereby it may be manipulated.

As an additional feature of improvement I provide mechanism adapted to act upon the lever *F* to give it a "snap" action, so as to cause it to move certainly and promptly to either limit of its throw after it has once been started, said mechanism being, however, so constructed and arranged that it may be used in conjunction with the handle or without the latter and also so that the action of the switch will in either case be absolutely positive. Said mechanism is constructed and arranged as follows:

G designates a thumb-nut arranged to extend through the casing *A'* in vertical alinement with the pivot-stud *f* of the switch-lever and provided at its lower end with a socket *g*, which engages the cylindrical-headed end of said pivot *f*. Said thumb-nut *G* is provided with an annular shoulder *g'*, which engages the top wall of the casing *A'*

and is free to rotate within the latter, the main part or shank G' of said thumb-nut being cylindrical below said collar g' and suitably insulated from the head portion G^2 .

5 $G^3 G^4$ designate two helical spring-wire coils arranged concentrically upon the said cylindrical shank G' and having their coils wound in opposite directions. The upper terminal end g^2 and g^5 of each of said coils is turned 10 vertically upward and inserted in a suitable socket formed in the under side of the portions g' of the thumb-nut G , so as to secure said springs rigidly to the latter, while the opposite or lower ends $g^4 g^5$ of said coils are 5 turned and extended radially outward in opposite directions along the upper side of the lever F and engaged with studs $f^3 f^4$.

G^5 designates a cylindrical sleeve interposed between the coils $G^3 G^4$ and rigidly secured 10 at its upper end to the body of the nut G . The normal internal diameter of each of the coils $G^3 G^4$ is slightly greater than the external diameter of the shank G' and sleeve G^5 , about which they are coiled, respectively, so 5 that the nut may be rotated some distance against the tension of one coil or the other, while the lever F remains stationary before the contraction of the coil incident to such rotation of the nut brings its interior into 10 close contact with the part about which it is coiled. When, however, the nut has been turned in one direction or the other a short distance, the said coils will be drawn taut, and further movement of the thumb-nut will 5 result in a positive movement of the lever upon its pivot in the same direction. The several blades of the fixed contacts, as hereinbefore described, are made slightly tapering or wedge-shaped, being thicker at their 10 connected or base ends, so that there is a tendency of the movable members to cling thereto due to the frictional engagement of said parts. The result of this construction is that 5 when the thumb-nut has been rotated sufficiently to overcome this frictional engagement of the movable members the spring of the coils will throw the lever instantly across from one limit of its movement to the opposite limit of movement, or, in other words, will 10 give the switch a snap action, and this snap action will be the same in whichever direction the members are oscillated. At the same time the construction by which the coils are eventually wound down to a taut condition 5 renders the action of the lever positive when actuated by said thumb-nut as soon as the latter has been rotated beyond a certain point.

Preferably and in the construction shown herein the thumb-nut is made removable, so 5 that it may be employed for operating the switch or not, as desired.

From the foregoing description it will be obvious that I have provided an extremely 5 simple and practical construction and one in which the operation of the switch is positive

and not open to the objections hereinbefore referred to.

While I have herein shown what I deem to be a preferred construction, yet it will be obvious that some modifications may be made 70 in the details thereof without departing from the spirit of the invention and without involving more than ordinary mechanical skill. I do not, therefore, wish to be limited to the precise details shown. 75

I claim as my invention—

1. A blade-switch comprising a switchboard, a central fixed contact member mounted thereon and provided with two oppositely-extending blades, terminal contact members 80 each provided with a blade, arranged adjacent to, and in alinement with, one of the blades of said central contact member, movable contact members each comprising a pair of parallel resilient blades secured together at both 85 ends so as to leave an intervening space and pivotally connected with a fixed terminal mounted upon the switchboard, said movable members being severally adapted for contact with each of the blades of each pair, means 90 for connecting line-wires with the several contact-terminals and means for simultaneously shifting said movable members from contact with the blades of the central contact member to those of the terminals adjacent thereto 95 and vice versa.

2. A blade-switch comprising a switchboard, a central fixed contact member mounted thereon and provided with two oppositely-extending blades, terminal contact members 100 each provided with a blade, arranged adjacent to, and in alinement with, one of the blades of said central contact member, movable contact members each comprising a pair of parallel resilient blades secured together at both 105 ends so as to leave an intervening space and pivotally connected with a fixed terminal mounted upon the switchboard, said movable members being severally adapted for contact with each of the blades of each pair, means 110 for connecting line-wires with the several contact-terminals and means for simultaneously shifting said movable members from contact with the blades of the central contact member to those of the terminals adjacent thereto 115 and vice versa; the contacting parts of said movable members being of a width greater than the space between the ends of the blades, whereby said spaces are bridged by the movable members when they are shifted. 120

3. A blade-switch comprising a switchboard, a central fixed contact member mounted thereon and provided with two oppositely-extending blades, a terminal contact member 125 provided with a blade, arranged adjacent to, and in alinement with, each of the blades of said central contact member, movable contact members each pivotally connected with a fixed terminal mounted upon the switchboard, said movable members being severally 130

adapted to be engaged with each of the blades of each pair, means for connecting line-wires with the several contact-terminals and means for simultaneously shifting said movable members from contact with the blades of the central contact member to those of the terminals adjacent thereto and vice versa; comprising a lever pivotally mounted upon the switchboard between its ends and links extending from the free ends of the movable members to and connected with said lever at points at opposite sides of and equidistant from the pivotal axis of the latter whereby said movable members are simultaneously shifted in opposite directions.

4. In a blade-switch, the combination of a fixed contact-blade and a movable contact member of female form comprising parallel resilient blades, secured together at each end by suitable spacing devices and adapted to receive the fixed blade between them.

5. In a blade-switch, the combination of a contact-blade and a relatively movable contact member of female form, comprising parallel resilient blades secured together at each end and held at a distance apart by suitable spacing devices so as to receive the fixed blade between them.

6. In a blade-switch, the combination of a contact-blade and a relatively movable contact member of female form, comprising parallel resilient blades secured together at each end and held at a distance apart by means of coiled springs forming spacing devices so as to receive the fixed blade between them.

7. In a blade-switch, the combination of a fixed contact-blade and a movable contact member of female form comprising parallel resilient blades, pivotally mounted at one end upon a fixed terminal member, a coil-spring interposed between the pivotally-connected ends of said parallel members and a space-block between the other ends thereof;

said movable member being adapted to receive the blade of the fixed member between its blade members.

8. In a switch provided with a pivoted oscillatory lever, and a handle connected therewith, means for giving a snap action to said lever in each direction independently of said handle comprising a cylindrical shank rotatively connected with the lever in axial alinement with its pivotal axis two oppositely-coiled springs coiled upon said cylindrical shank, each connected at one end with the body of the shank and at its other with the said lever and a handle for imparting rotary movement to said cylindrical shank.

9. In a switch provided with a pivoted oscillatory lever and a handle connected therewith, means for giving a snap action to said lever in each direction independently of said handle, comprising a cylindrical shank rotatively connected with the lever concentrically with the pivotal axis of the latter, two oppositely-coiled springs coiled upon said cylindrical shank each connected at one end with the body of the shank and at its other end with the said lever and the coil of each spring being of a normal interior diameter slightly greater than the external diameter of the part of the shank it encircles whereby the contraction of the coil incident to the charging of the spring will bring it into positive embracement of the shank and thereafter move the lever positively with the shank, and a handle for imparting rotary movement to said cylindrical shank.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 9th day of March, A. D. 1896.

ELMER H. WRIGHT.

Witnesses:

ALBERT H. GRAVES,
L. CLINTON HAMLIN.